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**REMARKS**

In view of the following discussion, the Applicants submit that none of the claims now pending in the application is anticipated under the provisions of 35 U.S.C. § 102. Thus, the Applicants believe that all of these claims are now in allowable form.

**I. REJECTION OF CLAIMS 1-31 UNDER 35 U.S.C. § 102****A. Claims 1-31**

The Examiner has rejected claims 1-31 in the Office Action under 35 U.S.C. § 102. Specifically, the Examiner rejected claims 1-31 in Paragraph 2 of the Office Action as being anticipated by Hall et al. (US patent 6,661,975, issued December 9, 2003, hereinafter Hall). Applicants respectfully traverse the rejection.

Hall teaches a multi-rate variable duty cycle modem. Specifically, Hall teaches an optical communication system where the modulator varies the duty factor of the modulated optical signal based on the encoded data signal. (See Hall, Column 1, lines 50-64)

The Examiner's attention is directed to the fact that Hall fails to teach a method for increasing transmission distance using tedons where an encoding scheme reduces a number of ones disproportionately relative to a number of zeros, as positively claimed in Applicants' independent claims. Specifically, Applicants' claim 1 shown below is representative of Applicants' independent claims.

1. A method for increasing transmission distance of a fiber optical communications link using tedons comprising the steps of:
  - encoding a data signal to be transmitted using an encoding scheme that reduces a number of ones disproportionately relative to a number of zeros in said data signal; and
  - transmitting said encoded data signal over said fiber optical communications link. (emphasis added)

Applicants teach a system and method for increasing transmission distance and/or transmission data rates using tedons and an encoding scheme that reduces the

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number of ones in a data signal. Long-haul transmission of information with optical fibers and in-line optical amplifiers, using digital on/off transmission format, suffers from two main impairments. One is the presence of the amplified spontaneous emission (ASE) noise of the amplifiers. The second impairment is the signal distortion caused by optical nonlinearity, chiefly the Kerr effect. Unfortunately, solutions that address one of these impairments often significantly exacerbate the other impairment.

In a binary channel, Applicants have disclose a method that can increase transmission distance and/or rate while substantially addressing both impairments. Applicants' invention teaches a method for increasing transmission distance using tedons where an encoding scheme reduces a number of ones disproportionately relative to a number of zeros, e.g., keeping probability of one to 25% and of zero to 75%. In other words, in a binary system where two symbols are equally probable, the present invention intentionally reduces a number of ones (a first symbol) disproportionately relative to a number of zeros (a second symbol). Namely, the present invention only reduces the number of occurrences of one symbol. This novel approach is completely absent in the Hall reference.

The Examiner cites Hall as teaching the use of  $\frac{1}{4}$  data rate as teaching the reduction of number of ones. However, Hall fails to teach that such reduction of ones is disproportional relative to a number of zeros. Namely, reducing the rate to  $\frac{1}{4}$  equally reduces both ones and zeros equally. Thus, Hall fails to anticipate Applicants' independent claims 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 30 and 31.

Furthermore, dependent claims 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28 depend from independent claims 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, respectively and recite additional limitation. For the same reasons discussed above, these dependent claims are also not anticipated by Hall and are allowable.

#### B. Claims 1-31

The Examiner has rejected claims 1-31 in the Office Action under 35 U.S.C. § 102. Specifically, the Examiner rejected claims 1-31 in Paragraph 3 of the Office Action as being anticipated by Wingard (US patent 6,295,318, issued September 21, 2001).

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Applicants respectfully traverse the rejection.

Wingard discloses a method for increasing the data rate over twisted copper pairs. First, the Examiner's attention is directed to the fact that Wingard also fails to teach a method for increasing transmission distance using tedons where an encoding scheme reduces a number of ones disproportionately relative to a number of zeros as discussed above. Second, Wingard discloses a twisted copper pairs implementation and not a fiber optical communication link. Thus, Wingard fails to anticipate Applicants' claims 1-31.

#### C. Claims 1-31

The Examiner has rejected claims 1-31 in the Office Action under 35 U.S.C. § 102. Specifically, the Examiner rejected claims 1-31 in Paragraph 4 of the Office Action as being anticipated by Puc (US patent 6,341,023, issued January 22, 2002). Applicants respectfully traverse the rejection.

Puc discloses a multiple level modulation in a wavelength-division multiplexing system. The Examiner's attention is again directed to the fact that Puc also fails to teach a method for increasing transmission distance using tedons where an encoding scheme reduces a number of ones disproportionately relative to a number of zeros as discussed above. Thus, Puc also fails to anticipate Applicants' claims 1-31.

#### D. Claims 1-31

The Examiner has rejected claims 1-31 in the Office Action under 35 U.S.C. § 102. Specifically, the Examiner rejected claims 1-31 in Paragraph 5 of the Office Action as being anticipated by Hakimi et al. (US patent 6,384,945, issued May 7, 2002). Applicants respectfully traverse the rejection.

Hakimi et al. discloses a nonlinear temporal grating as a new optical solitary wave. The Examiner's attention is again directed to the fact that Hakimi et al. also fails to teach a method for increasing transmission distance using tedons where an encoding scheme reduces a number of ones disproportionately relative to a number of zeros as discussed above. Thus, Hakimi et al. also fails to anticipate Applicants' claims

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1-31.

Conclusion

Thus, the Applicants submit that all of these claims now fully satisfy the requirements of 35 U.S.C. §102. Consequently, the Applicant believes that all these claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that there are any unresolved issues requiring the issuance of a final action in any of the claims now pending in the application, it is requested that the Examiner telephone Mr. Kin-Wah Tong, Esq. at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

7/6/04

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